East Cent. Afri. J. Pharm. Sci.
3(2000) 26-29

The Anti-Inflammatory Activity Of *Rumex usambarensis*

C.I.A. KABATI[1*], H. CHANDE[2], M.K. VISRAM[1] AND W.M. KALALA[1]

[1]*Department of Pharmaceutics and Pharmaceutical Microbiology, Faculty of Pharmacy*
[2]*Department of Histopathology and Morbid Anatomy, Faculty of Medicine, MUCHS*

The anti-inflammatory activity of the extract of *Rumex usambarensis* Dammer (Polygonaceae) was compared to that of diclofenac sodium. The results of this study have shown that the 0.4 ml and 0.8 ml of the extract had 40.6% and 69.3% of the anti-inflammatory activity of 10mg diclofenac sodium. Histological results were also consistent with the anti-inflammatory activity of *Rumex usambarensis*.

Key Word: *Rumex usambarensis,* anti-inflammatory

INTRODUCTION

Rumex usambarensis Dammer (Polygonaceae) has been used extensively by different traditional healers for the management of various diseases including treatment of cough, small pox, relief of thirst, liver and stomach conditions, constipation in children, abdominal pain during pregnancy, respiratory ailments, diarrhoea, dysentery, yaws, diabetes and skin eruptions on the fore arms[1,2,3,]. The juice of the leaves has been claimed to treat and cure tonsillitis. Its treatment of tonsillitis prompted us to search for properties of the plant, which are responsible for this action.

The antibiotic and antifungal activities of the plant have been documented [2]. The plant has been shown to be active against B*acillus subtilis, Staphylococcus aureus, Mycobacterium smegmatis, Candida albicans* and M*ycosporum canis [2]*. The plant has been shown to contain chrysophanic acid, emodin and physion, all of which are quinoid compounds [4,8]. We found no literature on the anti-inflammatory activity of this plant.

MATERIALS AND METHODS

The plant was collected from the botanical garden of the Faculty of Pharmacy and identified, both macroscopically and microscopically, by the Institute of Traditional Medicine and the Department of Botany, University of Dar es Salaam.

The fresh leaves were cut and wrapped in an aluminium foil and heated in a hot air oven at 180^{0}C until the leaves changed color from dark green to brownish green. They were then crushed and the juice expressed from the leaves manually. The expressed juice was centrifuged at 2600 rpm for 15 minutes to get a clear supernatant, which was kept in tightly closed universal bottles and autoclaved for 30 minutes at 120^{0}C. The sterile filtrate was then stored between 6^{0}C and of 8^{0}C in a refrigerator.

Twenty theiller albino rats were anaesthetised for 3 minutes using anaesthetic ether in a glass jar and their weights and rectal temperatures recorded. Since ether induced anaesthesia was short, 10mg/kg body weight of ketamine base was administered intramuscularly at the end of three minutes. The rats were divided into five groups of four: two controls, two tests and one standard. During the anaesthesia the control and test rats were given either 0.4 ml or 0.8 ml of either normal saline or the sterilized plant extract subcutaneously in the neck. The standard group rats were given 10 mg diclofenac sodium injection subcutaneously in the neck. Sixty minutes later all the five group of animals had their foot-volume measured and their rectal temperature taken using a digital quartz thermometer. Immediately after measurement of foot volume, each rat received

* Author to whom correspondence may be addressed.

volume of each animal was measured again and the rectal temperature recorded. The degree of inflammation was measured as the increase in foot volume [2].

The mean increases in foot volume and temperature for each of the groups were compared using one way analysis of variance [10]. Significance of differences between groups was determined using the Scheffe's multiple ranges comparison.

RESULTS AND DISCUSSIONS

Table 1: Mean foot volumes before and one hour after an intraplantar injection of dextran.

Treatment Group		Mean Foot Volume (ml)			Comparison with	
		Before Inj	After Inj	Increase	A	B
A	0.4 ml Normal Saline	0.73	1.66	0.93		
B	0.8 ml Normal Saline	0.76	1.71	0.95		
C	0.4 ml Plant Extract	0.75	1.48	0.73		*
D	0.8 ml Plant Extract	0.75	1.33	0.58	*	*
E	10 mg Diclofenac	0.75	1.16	0.41	*	*

* Significant difference ($p<0.05$) in analysis of variance comparing the mean increase in foot volume between the groups using Scheffe's multiple ranges comparisons.

Table 2: Mean Temperatures before and one hour after an intraplantar injection of dextran.

Treatment Group		Mean Foot Volume (^{0}C)			Comparison with	
		Before Inj	After Inj	Increase	A	B
A	0.4 ml Normal Saline	34.8	36.7	1.9		
B	0.8 ml Normal Saline	34.9	36.7	1.8		
C	0.4 ml Plant Extract	34.9	36.2	1.3	*	*
D	0.8 ml Plant Extract	35.1	36.1	1.0	*	*
E	10 mg Diclofenac	34.8	36.1	1.3	*	*

* Significant difference ($p<0.05$) in analysis of variance comparing the mean increase in temperature between the groups using Scheffe's multiple ranges comparisons.

Tables 1 and 2 demonstrate the anti-inflammatory activity of the plant extracts. The histological features of acute inflammation (fig 2) almost disappear after administration of the plant extracts as shown in fig 4. The 0.4 ml dose level of the plant extract showed a 96.6% mean increase in foot oedema of the test rats. Histological features are shown in figure 3, note the density of the neutrophils compared to the control rats.

The 0.8 ml dose level of the plant extract on the one hand and the standard injection of 10 mg diclofenac sodium on the other, showed 76.6% and 51.13% increase in foot oedema of the test and standard rats respectively. Figure 4 shows the histological features of the rats treated with 0.8 ml plant extract while figure 5 shows the histological features of standard rats treated with 10 mg diclofenac sodium. It is important to note the absence of neutrophils in both pictures.

Histological Features of foot pads of normal, control, test and standard rats

Fig 1: Histological features of foot pad of normal rat

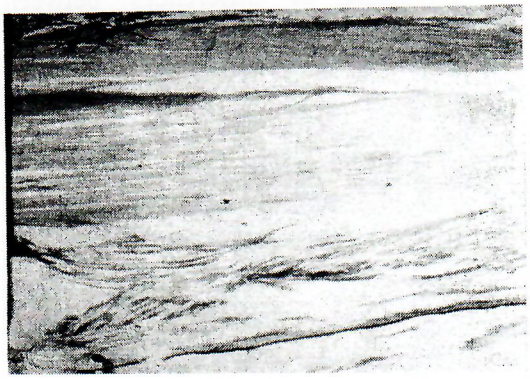

Fig 2: Histological features of foot pad treated with normal saline and dextran 70

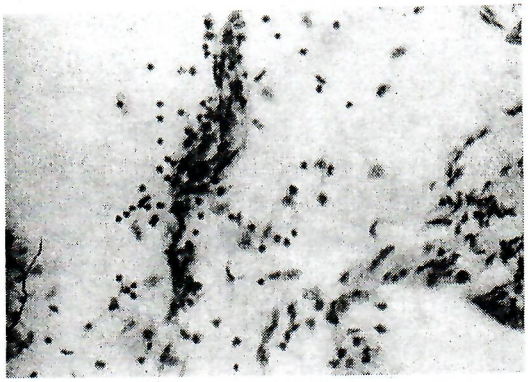

Fig 3: Histological features of foot pad treated with 0.4ml plant extract and dextran 70

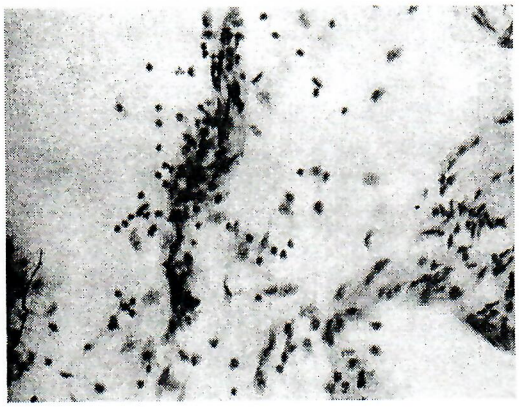

Fig 4: Histological features of foot pad treated with0.8 ml plant extract and dextran 70Fig 5:

Histological features of foot pad
treated with 10 mg diclofenac sodium
and dextran 70

Put roughly, it seems very likely at least, histologically, that the 0.8 ml dose level of the plant extract is as effective as 10 mg of diclofenac sodium not withstanding that the former was used as an extract.

Where as the 0.4 ml dose level of the plant extract has 40.6% of the anti-inflammatory activity of 10 mg diclofenac sodium the 0.8 ml dose level has 69.3% of the anti-inflammatory activity of 10 mg diclofenac sodium. The histological results are also consistent with the anti-inflammatory activity of *Rumes usambarensis*. Taking into account that a crude extract was used, isolation of the active component(s) may yield even better results.

The results of this study have shown that *Rumex usambarensis* has anti-inflammatory activity.

ACKNOWLEDGEMENT

The authors are highly indebted to Prof. Swai of the Department of Internal Medicine for his valuable contribution to this article.

REFERENCES

[1] J.O. Kokwaro. Medicinal plants of East Africa: East African Literature Bureau, Nairobi, Kenya (1976).

[2] Department of Pharmacology University of Tubigen Germany. Screening test for anti-inflammatory activity. (1992).

[3] J.M. Watt and M.G. Breyer-Brandwijk: The medicinal and poisonous plants of Southern and Eastern Africa 2nd Ed.1962 E.S. Livingstone Ltd. London: 868-869.

[4] NAPRALET profile for *Rumex usambarensis* part 3 nap (16/10/1998).

[5] W.B. Turill, E. Milne- Redhead; Flora of Tropical East Africa (Polygonaceae): 6-7 (19/2/1958).

[6] C.R. Metcalfe, L. Calk; Anatomy of the dicotyledones, volume II: 1092-1100(1962).

[7] S.C. Chhabra, R.C.A. Mahunnah, E.N. Mshiu; J. Ethnopharmacol 1991: (33) 143.

[8] J.O. Midiwo, G.M. Rukunga; Phytochemistry 1985: (246) 1390.

[9] I. Hedberg, O. Hedberg, P.J. Madati, K.E. Mshigeni, E.N. Mshiu, G. Samuelsson; J. Ethnopharmacol 1983 (9) 237

[10] SPSS Inc. Statistical package for the social sciences (1999).